



TAMIL NADU PUBLIC SERVICE COMMISSION

NOTIFICATION NO: 12/2017

DATED: 17.05.2017

Applications are invited from eligible candidates only through online mode upto 14.06.2017 for direct recruitment for the post of Assistant Professor of Radiology Physics.

It is mandatory for the applicants to register their basic particulars through one time online registration system on payment of Rs.150/- (Rupees One Hundred and Fifty only) towards registration fee and then should apply online for this recruitment. The One-Time Registration will be valid for 5 years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed fee.

Name of the Post and Code No	Name of the Service and Code No.	No. of vacancies	Scale of Pay
Assistant Professor of Radiology Physics (Code No.1958)	Tamil Nadu Medical Service. (Code No.048)	13	Rs.15,600-39,100/- + Grade Pay Rs.5400/- (PB-3)

2. DISTRIBUTION OF VACANCIES:-

GT (G)	GT(W)	GT(G)(PSTM)	BC(G)	BC(W)	BC(M)(G)	BC(G)(PSTM)	MBC/DC(G)	MBC/DC(W)	MBC/DC(G)(PSTM)	SC(G)	SC(W)	TOTAL
1	1	1	1	2	1	1	1	1	1	1	1	13

Abbreviation: W- Women, PSTM – Person Studied in Tamil Medium

3. IMPORTANT DATES AND TIME:-

A	Date of Notification	17.05. 2017	
B	Last date for submission of application through online	14.06.2017	
C	Last date for payment of Examination Fee through Bank (State Bank of India / Indian Bank)	16.06.2017	
Date of Written Examination			
D	Paper -I	03.09.2017 FN	10.00 AM to 1.00 PM
	Paper – II	03.09.2017 AN	2.30 PM to 4.30 PM

4. FEES:-

a)	<p><u>Registration Fee</u> For One Time Registration (Revised with effect from 01.03.2017 vide G.O.(Ms).No.32, Personnel and Administrative Reforms(M) Department, dated 01.03.2017) <u>Note:</u> Applicants who have already registered in One Time Registration system paying Rs.50/- before 01.03.2017 and those who have registered for One-Time Registration on or after 01.03.2017 by paying Rs.150/- are exempted from paying the registration fee for this recruitment.</p>	Rs.150/-
b)	<p><u>Written Examination Fee</u> <u>Note:</u> The Examination fee should be paid at the time of submitting the online application for this recruitment if they are not eligible for the concession noted below.</p>	Rs.200/-

EXAMINATION FEE CONCESSION:-

Category	Concession	Condition
(i) Scheduled Castes / Scheduled Caste (Arunthathiyars), Scheduled Tribes	Full Exemption	--
(ii) Differently Abled Persons, Destitute Widows of all communities	Full Exemption	(i) For Differently Abled persons, the disability should be not less than 40%. (ii) For DWs, the DW certificate should have been obtained from the RDO / Sub Collector / Assistant Collector
(iii) Most Backward Class / Denotified Communities, Backward Classes (Other than Muslim) and BCM	Those who have not availed three free chances so far in the previous recruitments may avail exemption from payment of examination fee.	Should not have availed three free chances in the previous recruitments.
(iv) Ex-Servicemen	Those who have not availed two free chances so far in the previous recruitments may avail exemption from payment of examination fee.	(i) Should not have availed two free chances in the previous recruitments. (ii) Fee concession will not apply to those who have already been recruited to any class or service or category.

- i. The three / two free chances referred to above are not for **EACH POST** but for **ANY THREE / TWO APPLICATION ONLY**. The claim for exemption from payment of examination fee made in any application which is rejected / admitted or withdrawn will be counted as a free chance availed.
- ii. Failure to pay the prescribed fee along with the application in-time will be liable for rejection of application.
- iii. The number of free chances availed by the applicant means the total number of free chances hitherto availed by the applicant in his / her earlier application submitted to the Commission for any post / recruitment.
- iv. If the examination fee concession claimed in the applications is found to exceed the admissible limits as announced above, the application will be rejected at any stage of selection. The number of free chances availed by the applicants will be counted from the previous applications submitted through One Time Registration and / or submitted directly without One-Time Registration i.e., before One Time Registration made as mandatory.

(For further details regarding fee concessions, refer para 12 of "Instructions to Applicants")

5. QUALIFICATIONS:-

(A) AGE LIMIT (as on 01.07.2017)

Sl. No.	Category of Candidates	Maximum Age
1	"Others" [i.e., Applicants not belonging to SCs, SC(A)s, STs, MBCs/DCs, BCs (OBCM) and BCMs	32 Years (should not have completed)
2	SCs, SC(A)s, STs, MBCs/DCs, BCs (OBCM), BCMs and DWs of all Castes	No Maximum Age Limit

Note:

Applicants not belonging to SCs, SC(A)s, STs, MBC/DCs, BCs (OBCM) and BCMs who have put in five years and more of service in the State / Central Government are not eligible to apply, even though they are within the age limit.

AGE CONCESSION

(i) For Differently Abled Persons:

- (a) No maximum age limit for the applicants who belong to SC, SC(A), ST, MBC/DC, BC (OBCM) and BCM.
- (b) "Others" not belonging to any of the categories mentioned in (a) above are eligible for age concession upto 10 years over and above the maximum age limit prescribed.

(ii) For Ex-servicemen

- (a) No maximum age limit for the applicants who belong to SC, SC (A), ST, MBC/DC, BC (OBCM) and BCM.
- (b) The maximum age limit is 48 years for "others" (i.e.) applicants not belonging to any of the categories mentioned in (a) above.
- (c) The above mentioned age concession will not apply to the Ex-Serviceman applicants those who have already been recruited to any class or service or category.

(For further details refer para 5 of the 'Instruction to Applicants')

(B) EDUCATIONAL QUALIFICATION: [as on 17.05.2017 (i.e. the date of notification)]

Applicants should possess the following or its equivalent qualification awarded by any University (or) Institution recognised by the University Grants Commission on the date of this notification:-

A degree of M.Sc., (Medical Physics) conducted by the College of Engineering in the Anna University, Chennai and duly declared eligible for appointment as Radiological Safety Officers in the Medical Institutions by the Division of Radiological Protection of the Bhabha Atomic Research Centre, Bombay:

or

- (i) A degree of M.Sc. (Physics); and
- (ii) Diploma in Radiology Physics awarded by the Bombay University after undergoing one year Post-Graduate course in Hospital Physics and Radiology Physics conducted by the Division of Radiological Protection of the Bhabha Atomic Research Centre.

Provided that, other things being equal, preference will be given to the Released Emergency Commissioned Officers, Released Short Service Commissioned Officers and other Ex-Servicemen.

Note-1:

- (i) The qualification, prescribed for this post should have been obtained by passing the required qualification in the order of studies, viz., 10th + HSC or its equivalent + Bachelor's degree + PG Degree as required under Section 25 Tamil Nadu Government Servants (Conditions of Service) Act 2016.

(Results of the examination should have been declared on or before the date of notification)

- (ii) The qualifications considered equivalent to the prescribed qualification are indicated in Annexure-I to this notification. (Refer also to the disclaimer annexed to the notification.)
- (iii) **Applicants claiming equivalence of qualification should upload and submit evidence for equivalence of qualification in the form of G.O issued prior to the date of this notification when called for, failing which their application will be summarily rejected. The G.O's issued regarding equivalence of prescribed qualification after the date of this notification will not be accepted.**

(For further details refer para. 10 of the 'Instructions to Applicants')

Note-2:**Upload of Document:**

The certificate issued by the Bhabha Atomic Research Centre should be uploaded in PDF format while applying online. If the certificate uploaded by the applicant is not clear and not readable, the online application of the applicant will be rejected without any further notice.

C. CERTIFICATE OF PHYSICAL FITNESS:-

Applicants selected for appointment to this post will be required to produce a certificate of physical fitness in the form prescribed below:-

Standard of Vision Prescribed	Form of Certificate of Physical Fitness
Standard – III or better	Form prescribed for other than Executive and Ministerial

Applicants with defective vision should produce eye fitness certificate from a qualified eye specialist when called for.

D. Knowledge of Tamil:-

Applicants should possess adequate knowledge of Tamil on the date of this Notification.

(For details refer para 11 of the Commissions' 'Instructions to Applicants')

6. Private Practice:

Assistant Professors of Radiology Physics are not allowed to engage themselves in private practice.

7. GENERAL INFORMATIONS:-

- A. The rule of reservation of appointments is applicable to the post.
- B. In G.O.(Ms).No. 145, Personnel and Administrative Reforms(S) Department, dated 30.09.2010 and G.O.Ms.No.40, Personnel and Administrative Reforms(S) Department, dated 30.04.2014 the Government have issued Orders to fill up 20% of all vacancies in direct recruitment on preferential basis to persons who studied the prescribed qualification in Tamil Medium. The 20% reservation of vacancies on preferential allotment to Persons Studied in Tamil Medium (PSTM) will apply for this recruitment. (Applicants claiming this reservation should have studied the prescribed qualification for the post in Tamil Medium and should have the certificate for the same. Having written the examination in Tamil language alone will not qualify for claiming this preference). If the applicants with PSTM certificate are not available for selection for appointment against reserved turn such turn shall be filled up by Non-PSTM candidates but belonging to the respective communal category. The PSTM certificate shall be produced / uploaded by the applicant in prescribed format / proforma available in the Commission's website at 'www.tnpsc.gov.in' which shall be obtained from the Head of the Institution when called for by the Commission.
(Further details refer para 27 (XIX) of 'Instructions to Applicants').
- C. The number of vacancies advertised is only approximate and is liable for modification including reduction with reference to vacancy position at any time before finalization of selection.
- D. The selection for appointment to the above said post is purely provisional subject to final Orders on pending Writ Petitions, if any, filed at Madras High Court and Madurai Bench of Madras High Court.

- E. Reservation of appointment to Destitute Widows and Ex-Servicemen will not apply to this recruitment.
- F. Three percent reservation of vacancies for differently abled persons is applicable for this recruitment. However, the turns earmarked for differently abled persons do not fall within the turns utilized for this recruitment.
- G. The Differently Abled persons should upload a copy of certificate of physical fitness specifying the nature of physical handicap and the degree of disability based on the norms laid down, from the Medical Board to the effect that his/her handicap will not render him/her incapable of efficiently discharging the duties attached to the post to which he/she has been selected when called for by the Tamil Nadu Public Service Commission.
- H. If no qualified and suitable women applicants are available for selection against the vacancies reserved for them, those vacancies will be filled by male applicants belonging to the respective communal categories.
- I. Wherever vacancies are reserved for Arunthathiyars on preferential basis, even after filling up of the vacancies reserved for SC Arunthathiyars on preferential basis, if more number of qualified Arunthathiyars are available, they shall be entitled to compete with the Scheduled Castes other than Arunthathiyars in the inter-se merit among them and if any posts reserved for Arunthathiyars remain unfilled for want of adequate number of qualified applicants, it shall be filled up by Scheduled Castes other than Arunthathiyars. However, turns earmarked for SC Arunthathiyars does not fall within the turns utilized for this recruitment.
- J. Evidence for claims made in the online application should be uploaded / submitted in time when documents are called for. Any subsequent claim made thereafter on submission of online application will not be entertained.
- K. Correct and True information regarding arrest, convictions / debarment / disqualification by any recruiting agency, criminal or any disciplinary proceedings initiated / pending or finalized, participation in agitation or any Political Organization, candidature in election for Parliament/State Legislature/Local Bodies etc., if any, should also be furnished to the Commission at the time of application i.e., the details thereof, originals of the Judgement, order / or G.O dropping further action in Departmental proceedings or any document that may prove the suitability of such candidates for a Government appointment in such cases must be produced at the stage / time of Certificate Verification without fail.
- L. Incomplete applications and applications containing false claims or incorrect particulars relating to category of reservation / preferential claim as PSTM / other basic qualification / eligibility wise / age / communal categories / educational qualification / physical qualification and other basic eligibility criteria will be liable for rejection.**
- M. One Time Registration is not an application for the Post / Recruitment. Though the details / particulars were furnished in the One Time Registration by the applicants, the details /particulars were furnished in the online application for this recruitment alone will be taken into consideration. Tamil Nadu Public Service Commission will not be responsible for any consequences arising out of furnishing of incorrect and incomplete details in the application or omission to provide the required details in the application for this recruitment.**

8. SCHEME FOR WRITTEN EXAMINATION (OBJECTIVE TYPE) (OMR METHOD) AND ORAL TEST:-

Subject	Duration	Maximum Marks	Minimum Qualifying Marks for selection	
			SCs, SC(A)s, STs, MBCs/ DCs, BCs (OBCM) and BCM	Others
<u>PAPER – I (PG Degree Standard) (200 items)</u> Medical Physics (Subject Code No. 263)	3 Hours	300	171	228
<u>PAPER – II</u> General Studies (Degree Standard) – 100 items	2 Hours	200		
General Studies – 75 items Aptitude & Mental Ability Test- 25 items (SSLC Standard)				
Interview & Record		70		
Total		570		

The applicants who have not appeared for any of the papers in the Written Examination or for Oral Test will not be considered for further selection process even if they secure the minimum qualifying marks for selection.

Note:

1. The question paper for Medical Physics will be set in English only and the question paper for General Studies will be set both in English and Tamil.
2. The Syllabi for the Written Examination is available in Annexure-II of the notification and also available at the Commission's website www.tnpsc.gov.in.
3. Refer para 22 of "Instructions to Applicants" in regard to instructions to be followed while appearing for competitive examinations conducted by the Commission.

9. CENTRE FOR EXAMINATION AND CODE NUMBER:-

Written Examination will be held at the **Chennai Centre** (Code .0100) only.

Note:

- (i) Request for change of venue will not be complied with. (For further details refer Instruction to Applicants)
- (ii) The Commission reserves the right to increase the number of Examination Centre and to re-allot the candidates.
- (iii) Applicants should appear for the Written Examination / Certificate verification / Oral Test at their own expenses.

10. MODE OF PAYMENT OF EXAMINATION FEE:-

- Examination fee Rs.200/- (Rupees Two Hundred only) is payable online through Net banking / Credit card / Debit card or it can be paid at SBI / at Indian Bank within 2 days from the date of submission of online application, by choosing the option in the online application.
- Applicants have to register their basic particulars through One -Time Registration which is mandatory on payment of Rs.150/- towards registration fee and then should apply online for this recruitment. The One-Time Registration will be valid for 5 years from the date of registration. Thereafter, the registration should be renewed by paying the prescribed fee. Applicants who have already registered in one time Registration system paying Rs.50/- before 01.03.2017 and those who have registered for One-Time Registration on or after 01.03.2017 by paying Rs.150/- towards One-Time Registration are exempted from paying the registration fee for this recruitment.
- Applicants have also to pay the service charges applicable to the **State Bank of India / Indian Bank**.
- Applicants can avail exemption from paying examination fees as per eligibility criteria.
- **Offline mode of payment in the form of Demand Draft / Postal Order etc., will not be accepted and the applications forwarded with such modes of payment will be summarily rejected.**
- Those who have registered in the **One -Time Registration** system, and paid the registration fee of Rs.150/- and received the registration ID **need not pay** the Registration fee i.e., Rs.150/- and it is enough to pay the examination fee alone.
- Applicants who have made One-Time Registration must pay the prescribed examination fee for this recruitment unless fee exemption is claimed. (One-Time Registration is only to avail exemption for Registration fee for a period of 5 years from the date of registration and it will not be considered as prescribed examination fee for this recruitment).

(For further details regarding the Examination fee concessions refer para 12 of the 'Instructions to Applicants').

11. PROCEDURE OF SELECTION:-

The selection will be made in two successive stages, viz. (i) Written Examination and (ii) an Oral Test in the form of an Interview.

(For further details refer Para 23(b) of the 'Instructions to applicants')

12. NO OBJECTION CERTIFICATE / AND INFORMATION TO THE EMPLOYER:-

No Objection Certificate obtained from appropriate authority shall be produced at the time of Certificate Verification. Failure to produce at that time will lead to rejection of application.

For details refer para 15 (g) of Commission's 'Instructions to Applicants'. - Any violation of this instruction will be liable for / end in rejection of application and forfeit his/her candidature.

13. CONCESSIONS:-

- i. Concessions in the matter of age and/or fees allowed to SCs, SC(A)s, STs, MBCs/DCs, BCs(OBCM), BCMs, Destitute Widows, Differently Abled Persons, Ex- servicemen, other categories of persons etc., are given in para 12 to 14 of the 'Instructions to Applicants'.
- ii. Persons claiming concessions referred to above and other claims made in the application have to produce evidence for such claim when called for, otherwise his / her application will be liable for rejection.

Note:

In all cases, an Ex-serviceman once recruited to a post in any class or service or category, **cannot claim the concession** of being called an Ex-serviceman for his further recruitment (G.O.Ms.No.89, Personnel and Administrative Reform(S) Department, dated 12.08.2015).

14. HOW TO APPLY:-

1. Applicants should apply only through online mode in the Commission's Websites www.tnpsc.gov.in/www.tnpscexams.net/www.tnpscexams.in
2. One Time Registration (OTR) and applicant Dashboard are mandatory before applying for any post. Applicant should register only once in the One Time Registration by paying Rs.150/- as Registration fee. Successfully registered One Time Registration is valid for 5 years from the date of Registration. All the applications should be submitted using the One Time Registration ID and password registered by the applicant.
3. For applying in One Time Registration, the applicants should have scanned image of their photograph, certificate wherever insisted and signature in CD/DVD/Pen Drive to upload the photo, certificate and signature.
4. Applicants who have already registered in One Time Registration on or before 29.09.2015 shall use their existing user ID and Password to create applicant Dashboard in the new One Time Registration system. No applicant is permitted to create more than one registration ID in One Time Registration.
5. Enter the Unique ID and password to view the already available information and update them.
6. **One Time Registration is not an application for any post.** It is just collection of information from the applicants and giving a separate dashboard to each applicant to facilitate them to maintain their own profile. Applicant who wishes to apply for any post shall click "**Apply**" against the post Notified in the Commission's Website and use the same USER ID and PASSWORD given for ONE TIME REGISTRATION.
7. Select the name of the post or service for which you wish to apply.
8. Applicants are required to upload their photograph and signature as per the specifications given in the Guidelines for Scanning and Upload of Photograph and Signature.
9. **An Online application uploaded without the photograph, specified documents and signature will be rejected.**

10. All the particulars mentioned in the online application including name of the Candidate, Post applied, educational qualifications, Communal Category, Date of Birth, Address, Email ID, Centre of Examination etc. will be considered as final and **no Modifications will be allowed after the last date specified for applying online.** Since certain fields are firm and fixed and cannot be edited, applicants are requested to fill in the online application form with the utmost care and caution as no correspondence regarding change of details will be entertained.

11. Print Option:-

- a) After submitting the application, applicants can print / save their application in PDF format.
- b) On entering registration number and password, applicants can download their application and print, if required.
- c) Need not send the printout of the online application or any other supporting documents to the Commission. The certificates will be verified only when the applicants come up for next stage of selection.

12. One Time Registration will not be considered as an application for any post.

15. OTHER IMPORTANT INSTRUCTIONS:-

- a) **Applicants should ensure their eligibility for examination:** The applicants applying for the examination should go through all instructions carefully and ensure that they fulfil all eligibility conditions for admission to examination. **Their admission to all stages of the examination will be purely provisional subject to satisfying of the eligibility conditions.** Mere issue of memo of admission to the applicant will not imply that his/her candidature has been fully cleared by the Commission.
- b) The Hall Tickets for eligible applicants will be made available in the Commission's Website www.tnpsc.gov.in or www.tnpscexams.net or www.tnpscexams.in for downloading the same by applicants. No Hall Tickets will be sent by post. So the applicants should watch TNPSC website before the scheduled date of examination. The Applicants must comply with each and every instruction given in the Hall Ticket.
- c) **Grievance Redressal Cell for guidance of applicants:-** In case of any guidance /information / clarification of their applications, candidature, etc., applicants can contact Tamil Nadu Public Service Commission's Office in person or over Telephone No.044-25332833 / 25332855 or the Commission's Office Toll-Free No. 1800 425 1002 on all working days between 10.00 a.m. and 05.45 p.m.
- d) **Mobile Phones and other Articles Banned:**
 - i. Applicants are not allowed to bring Cellular Phone, Watches and Ring with Inbuilt Memory Notes etc., or any other Electronic device and Non Electronic devices such as P&G Design Data Book, Books, Notes, Hand Bags and Recording Device either as separate piece or part of something used by the applicants such as Watch or Ring etc., to the examination hall / room on the date of examination.
 - ii. If they are found to be in possession of any such thing or instrument they will not be allowed to write the examination further, besides invalidation of answer paper and / or debarment. If it is considered necessary they will be subjected to thorough physical search including frisking on the spot. (For further details refer Instructions to Applicants).

- iii. Do not bring into the Examination Hall any article such as books, notes, loose sheets, electronic or any other type of calculators, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Text Books, rough sheets etc., except the permitted writing material (i.e. pen). No colour pen or Pencil must be used.
- iv. Applicants are advised in their own interest not to bring any of the banned items including Mobile Phones to the venue of the examination, as arrangements for safekeeping cannot be assured.
- e) Unless specific instruction is given, applicants are not required to submit along with their application any certificates in support of their claims regarding age, educational qualifications, physical qualification, community certificates and certificates regarding their physical disability etc., which should be submitted when called for by the Tamil Nadu Public Service Commission. The applicants applying for the examination should ensure that they fulfil all the eligibility conditions for admission to the Examination. Their admission at all the stages of examination for which they are admitted by the Commission viz. Written Examination and Oral Test will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after Written Examination, Certificate Verification and Oral Test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the recruitment will be liable for rejection / cancellation by the Commission. (For further details refer Instructions to Applicants).
- f) If any of their claims is found to be incorrect, it will lead to rejection of their candidature and suitable penal action.
- g) **Unfair means strictly prohibited:** No applicants shall copy from the papers of any other candidate or permit his papers to be copied or give or attempt to give or obtain or attempt to obtain irregular assistance of any description. (For further details refer Instructions to Applicants).
- h) **Conduct in Examination Hall:** No applicant should misbehave in any manner or create a disorderly scene in the Examination Hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be severely viewed and penalised. (For further details refer Instructions to Applicants).
- i) For violations of "Instruction to Applicants" in any manner suitable penalty will be imposed as per the Instructions to applicants or as deemed fit by the Commission.

The Online Application can be submitted upto 14.06.2017 till 11.59 p.m., after which the link will be disabled

(For detailed information applicants may refer Commission's 'Instructions to Applicants' at the Commission's website www.tnpsc.gov.in)

Secretary

DISCLAIMER

“The Government orders relating to Equivalence of qualification have been hosted in the Tamil Nadu Public Service Commission website. However the candidates while applying for the examination should furnish the details of equivalence of qualification in the form of Government orders issued prior to the date of this notification, if any, which are not mentioned in Annexure-I to the notification and produce the same when called for by Tamil Nadu Public Service Commission, failing which their application will be rejected. The Government Orders regarding equivalence of qualification issued after the date of this notification will not be accepted.”

Secretary

Annexure-I**Government Orders of equivalence of qualification**

Sl. No.	Degree	Equivalence Degree	G.O.
1.	M.Sc. Physics	காந்திகிராமம் ஊரக நிலையத்தால் (நிகர் பல்கலைக் கழகம்) வழங்கப்படும் செயல்முறை இயற்பியல் (Applied Physics) முதுநிலைப் பட்டப் படிப்பு பிற பல்கலைக் கழகங்களால் வழங்கப்படும் இயற்பியல் முதுநிலை பட்டப் படிப்புக்கு (M.Sc., Physics) இணையானது.	அரசாணை நிலை எண். 133, பணியாளர் மற்றும் நிருவாகச் சீர்திருத்த (ஆர்) துறை, நாள் 28.07.1999
2.	M.Sc. Physics	M.Sc., Bio-Physics is equivalent to M.Sc., Physics	G.O.(Ms) No. 72, Higher Education (K2) Department, dated 30.04.2013.
3.	M.Sc. Medical Physics	M.Sc. Medical Radiation Physics awarded by Manipal University, Karnataka be treated as equivalent to M.Sc. Medical Physics awarded by Anna University.	G.O. Ms.No.333, Health and Family Welfare (AA1) Department, dated 19.12.2011.
4.	M.Sc. Medical Physics	M.Sc. Medical Physics awarded by Bharathiar University, Coimbatore be treated as equivalent to M.Sc. Medical Physics awarded by Anna University.	G.O. Ms.No. 175, Health and Family Welfare (AA1) Department, dated 18.07.2011.

*Annexure - II***MEDICAL PHYSICS**

(PG DEGREE STANDARD)

CODE NO: 263

UNIT I - BASICS OF RADIOLOGICAL PHYSICS:

Atomic Structure - Nuclear Transformation - Radioactivity and radioactive decay successive disintegration and equilibrium conditions - Interaction of Radiation with matter; electromagnetic radiation, charged particles and neutrons - Radiation attenuation coefficients - Radiation dosimetric concepts, quantities and units - cavity theories - Principles of Radiation detection and measurements - Radiation dosimeters and Radiation monitors.

UNIT II - RADIATION THERAPY PHYSICS:

Radiotherapy with sealed and unsealed radionuclide – Mechanism of Telecobalt and linear accelerators (LINAC) – Physics of Modern radiotherapy machines - 3D CRT, IMRT, SRS & SRT, IGRT, cyber knife and Proton Beam therapy - Radiation Dosimetry protocol (TRS 398), Calibration of teletherapy equipments - Quality Assurance of Radiotherapy machines - Treatment Planning System (TPS) in radiation therapy & Quality assurance of TPS.

UNIT III - PHYSICS OF BRACHYTHERAPY:

Introduction to Brachytherapy radionuclide and their properties - Production and construction of sealed – LDR, MDR and HDR Brachytherapy sources, their specification & calibration - reference Exposure rate - reference air kerma rate and air kerma strength - source calibration using an In-air set-up and calibration using a well type ionization chamber - source calibration using solid phantoms- source dosimetry - Interstitial, Intracavitary, intraluminal and pulsed brachytherapy - Monte Carlo Based source dosimetry - Quality assurance of brachytherapy equipments.

UNIT IV - BIOLOGICAL EFFECTS OF RADIATION:

Physics of radiation absorption - Cancer biology - Cell survival curves - Fractionation in Radiation therapy- dose rate effect - Oxygen Enhancement Ratio (OER) - Relative Biological Effectiveness (RBE) – Linear Energy Transfer (LET) - Molecular mechanism of DNA & chromosomal damage and repair – 4 R's of Radiobiology - Bioeffect models; Time Dose Fractionation (TDF) and Extrapolated Response Dose (ERD) - Hyperthermia - Radioprotectors - Effects of radiation on embryo and fetus - Acute radiation syndrome.

UNIT V - RADIATION HAZARD EVALUATION AND CONTROL:

Basic concepts of Radiation protection standards - philosophy behind radiation protection - External radiation protection - ICRP recommendations - Radiation dose limits - system of radiological protection - Equivalent dose, effective dose, committed dose - radiation exposures - Evaluation of external and internal radiation hazards and control - ALI-DAC- MPBB - planning and shielding calculations - radioactive waste disposal - Radiation emergencies, medical management and legislation.

UNIT VI - DIAGNOSTIC RADIATION PHYSICS:

Basic Physics of diagnostic radiology – Production of X-rays - diagnostic X-ray tube & its electrical circuits- X-ray tube rating - X-ray film, properties & Processing - Intensifying screens - Factors affecting radiographic imaging - fluoroscopy - Tomography - Various diagnostic X-ray tubes and shields – Computer Tomography (CT) and its generations - Quality assurance of diagnostic equipments - Digital subtraction angiography (DSA).

UNIT VII - PHYSICS OF NUCLEAR MEDICINE:

Scintillation counters - Different types of collimators - Gamma camera - single head and dual head scanners - Emission tomography - Single photon emission computed tomography (SPECT) - Positron emission tomography (PET) - Production of radioisotopes for nuclear medicine procedure - Technetium generator - Radiopharmaceuticals and their clinical applications.

UNIT VIII - PHYSICS OF ULTRASOUND & IMAGING:

Production & properties of ultrasound - propagation of ultrasound through body tissue - Acoustic impedance and acoustical characteristics in human body - ultrasound dosimetry - piezoelectric transducers - ultrasound scanning modes - Ultrasound cardiography (UCG) - Doppler effect - Double doppler shift - doppler systems - ultrasonic tomography - applications of ultrasound in medicine.

UNIT IX - LASERS IN MEDICINE AND THERMOGRAPHY:

Theory and production of medical lasers - Laser Tissue interaction mechanism - Applications of lasers in Dermatology, Oncology, Ophthalmology - Application of ultrafast pulsed lasers in Medicine - laser blood flow meter, Hazards of lasers and their safety measures - Various types of electromagnetic radiations; UV, Visible, IR, their sources and detectors - Optical properties of tissues - Medical Applications of IR radiations in diagnosis and therapy.

UNIT X - MRI AND BIO MEDICAL INSTRUMENTATION :

Basic principles of Magnetic resonance imaging (MRI) - Larmor frequency - Resonance - Slice selection - localization within slices - Mechanism of relaxation (T1 and T2) - contrast agents - MRI system - Electrocardiography (ECG) - Electroencephalography (EEG) - Electromyography (EMG) - physiological assist devices - pacemaker - defibrillators - heart lung machine - diathermy units - Dialysis units; Hemo & peritoneal dialysis - Blood cell counter.